

Desert Pavements & Vesicular Horizons:

- What are they?
- Where do they occur?
- How do they form?
- What is their ecological significance?

Desert pavement

- Surface feature in deserts.
- Closely fitted, single layer of clasts.

Rough surface of desert pavement traps dust

Dust moves beneath clasts, lifts them up



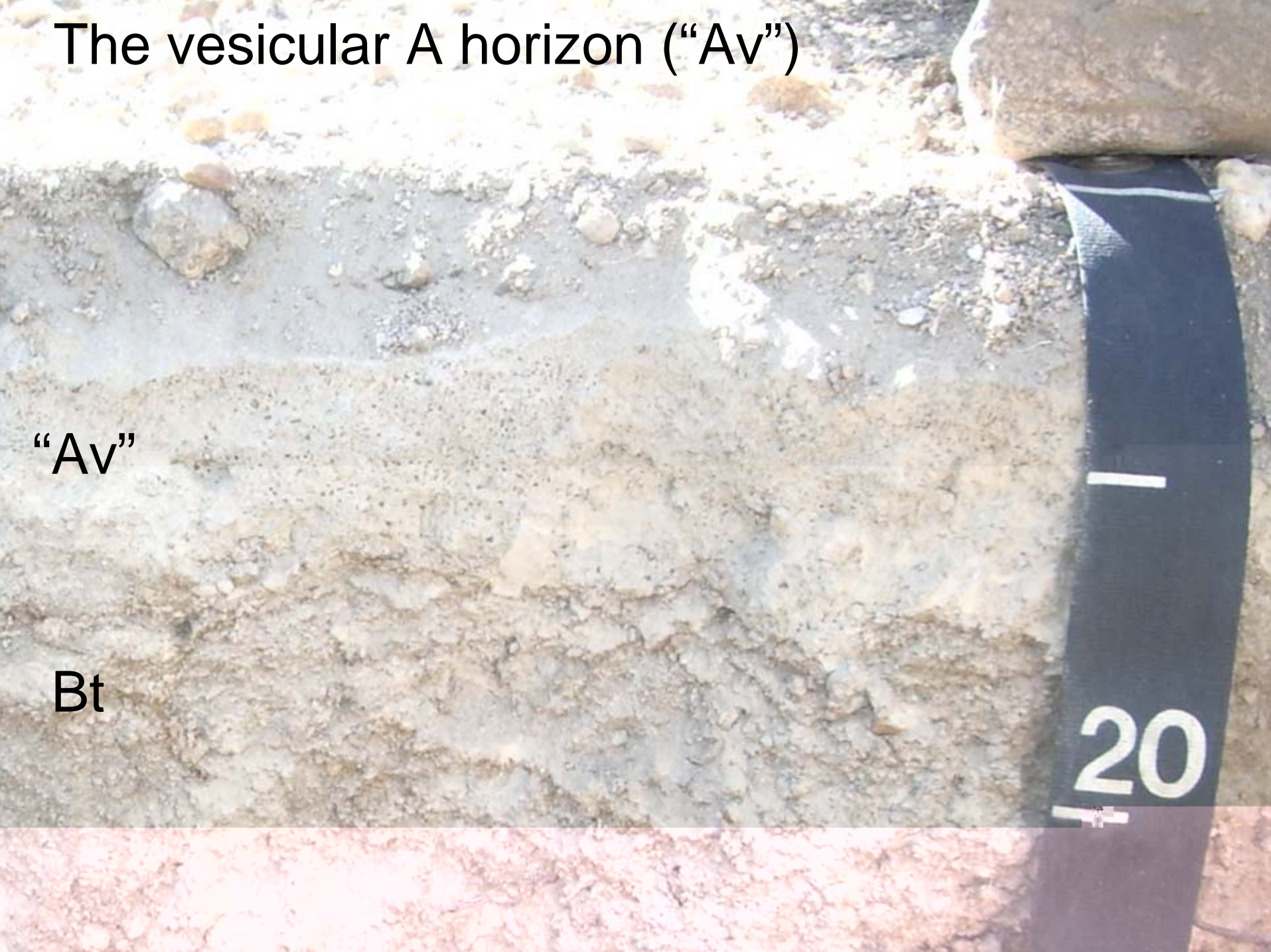
Vesicular horizons

- Occur at or near the surface.
- Contain abundant vesicular pores.
- Platy structure or massive.
- Often 3-10 cm thick.

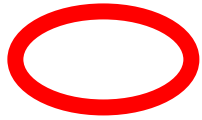
The vesicular A horizon (“Av”)

“Av”

Bt

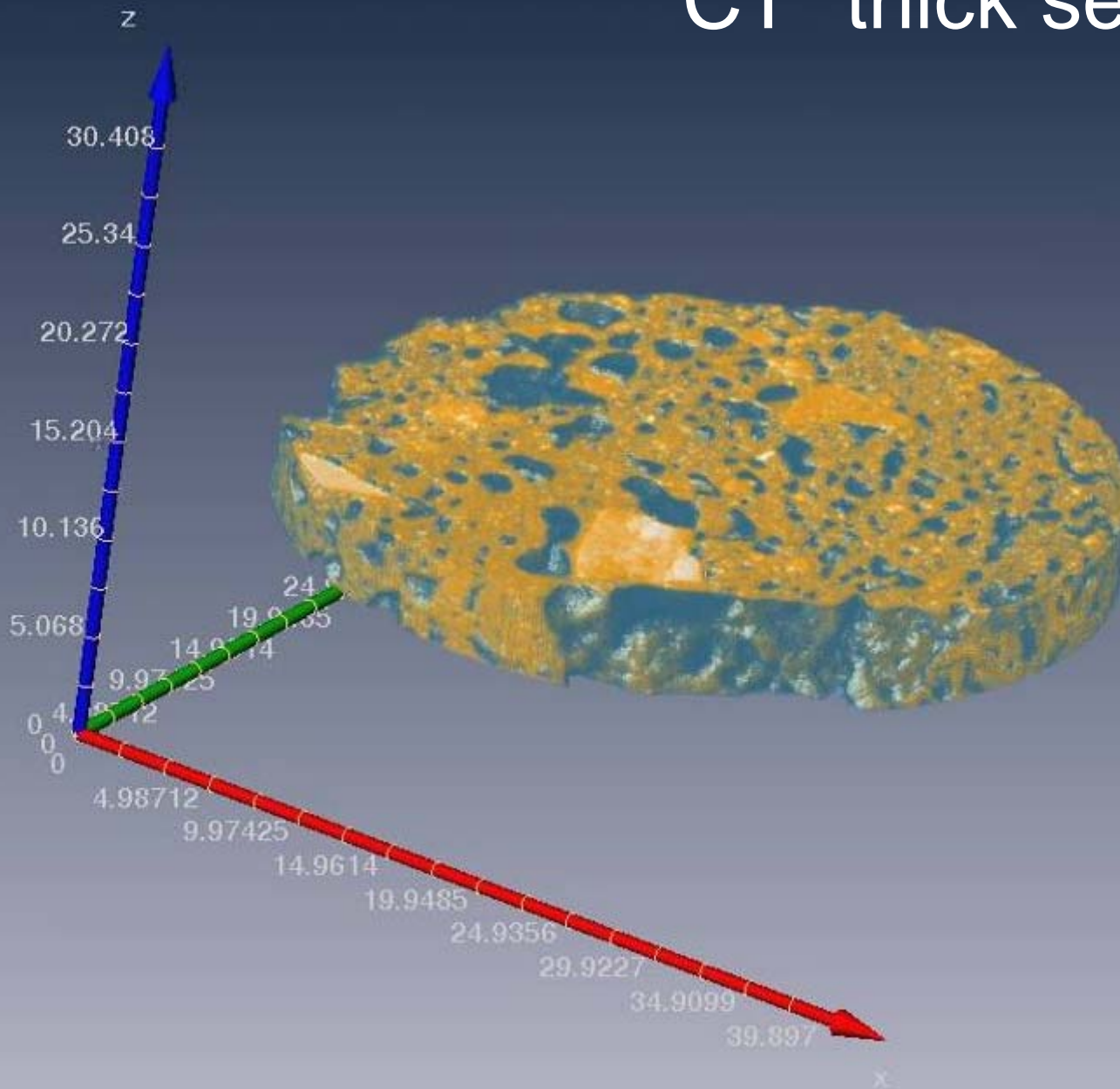


Springer, 1958. *SSSA Proc.*



X-ray computed tomography of vesicular horizon

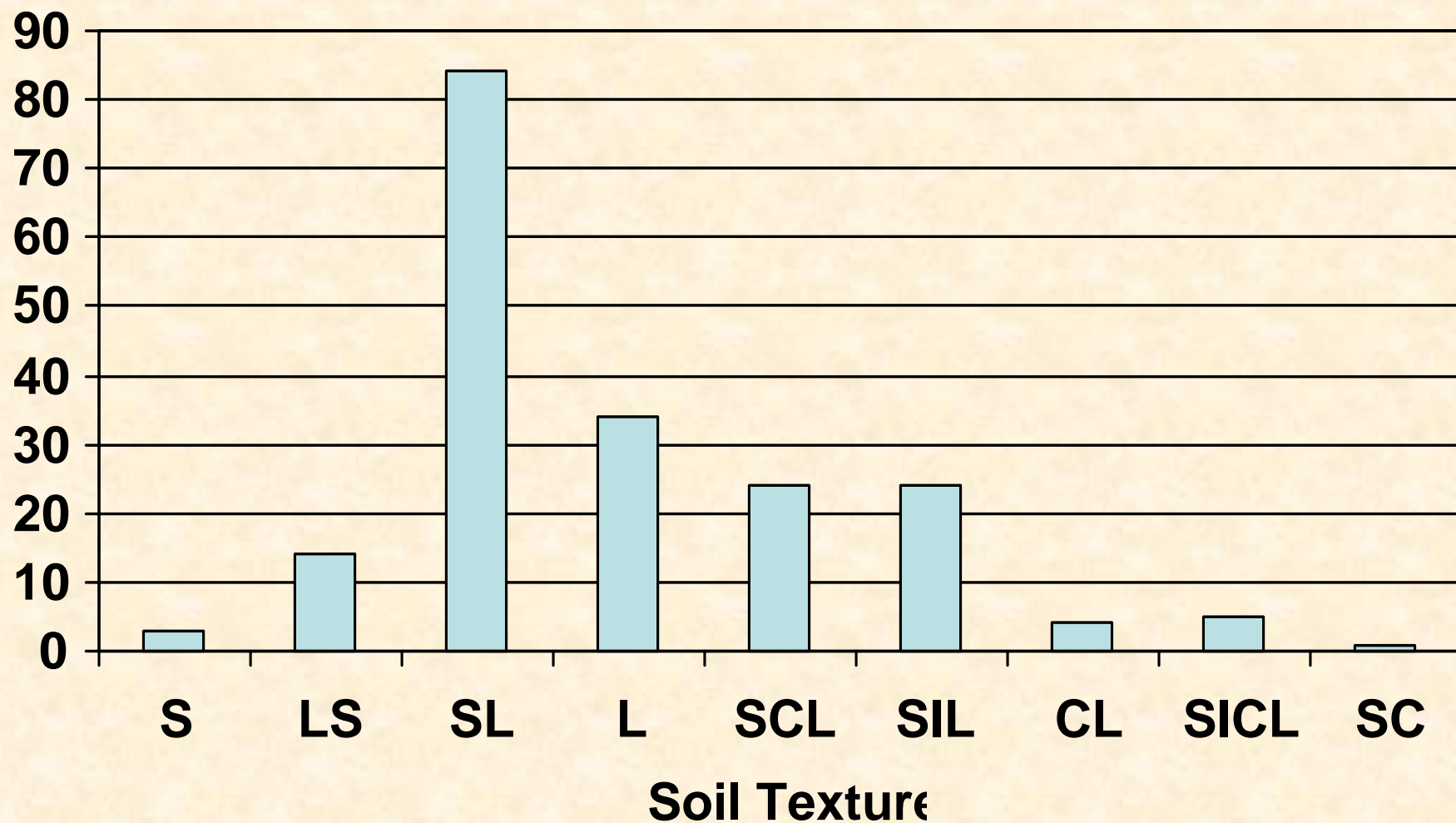
CT “thick section”



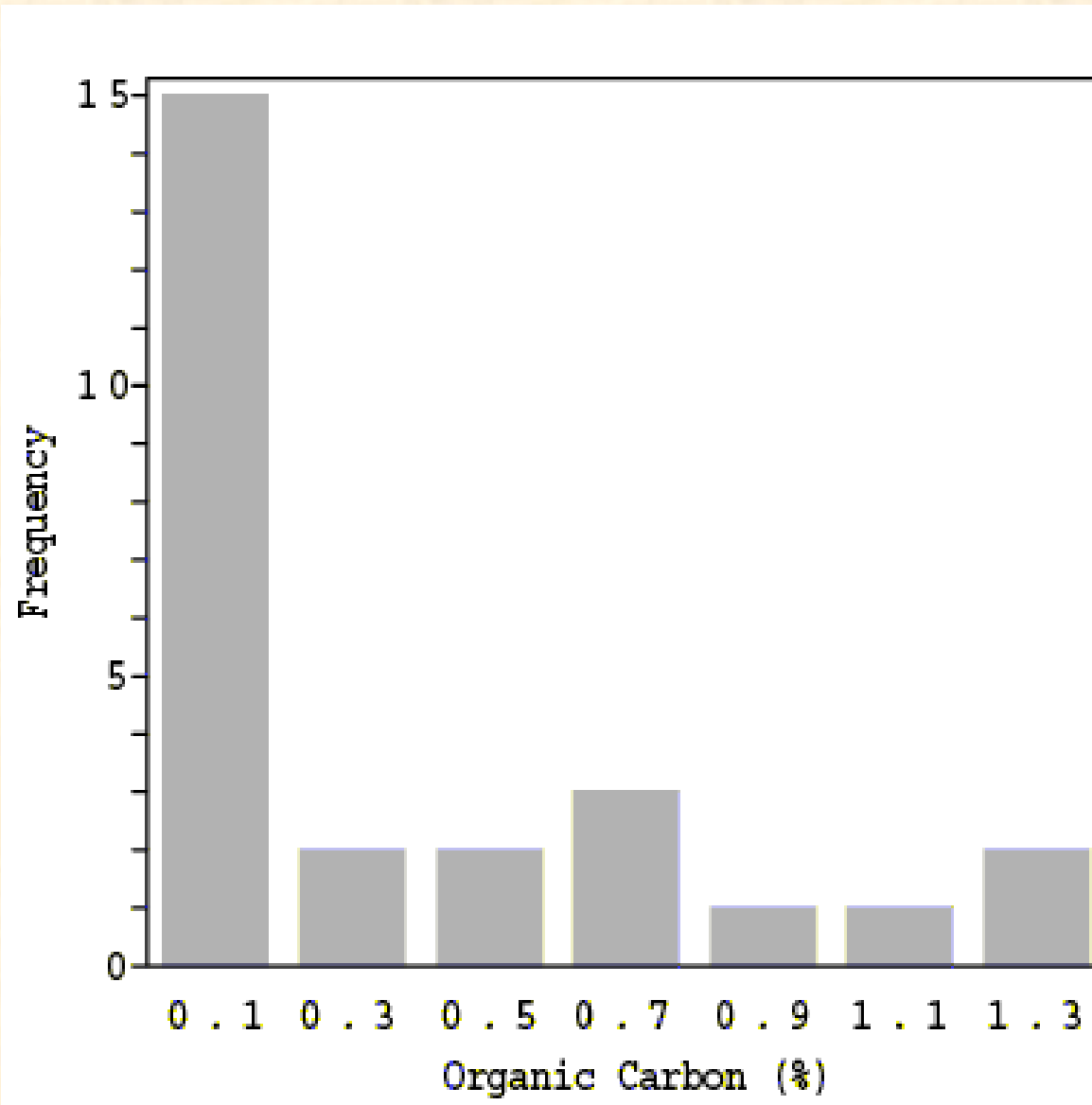
3-D image of vesicular pores

Vesicular Horizon Textures

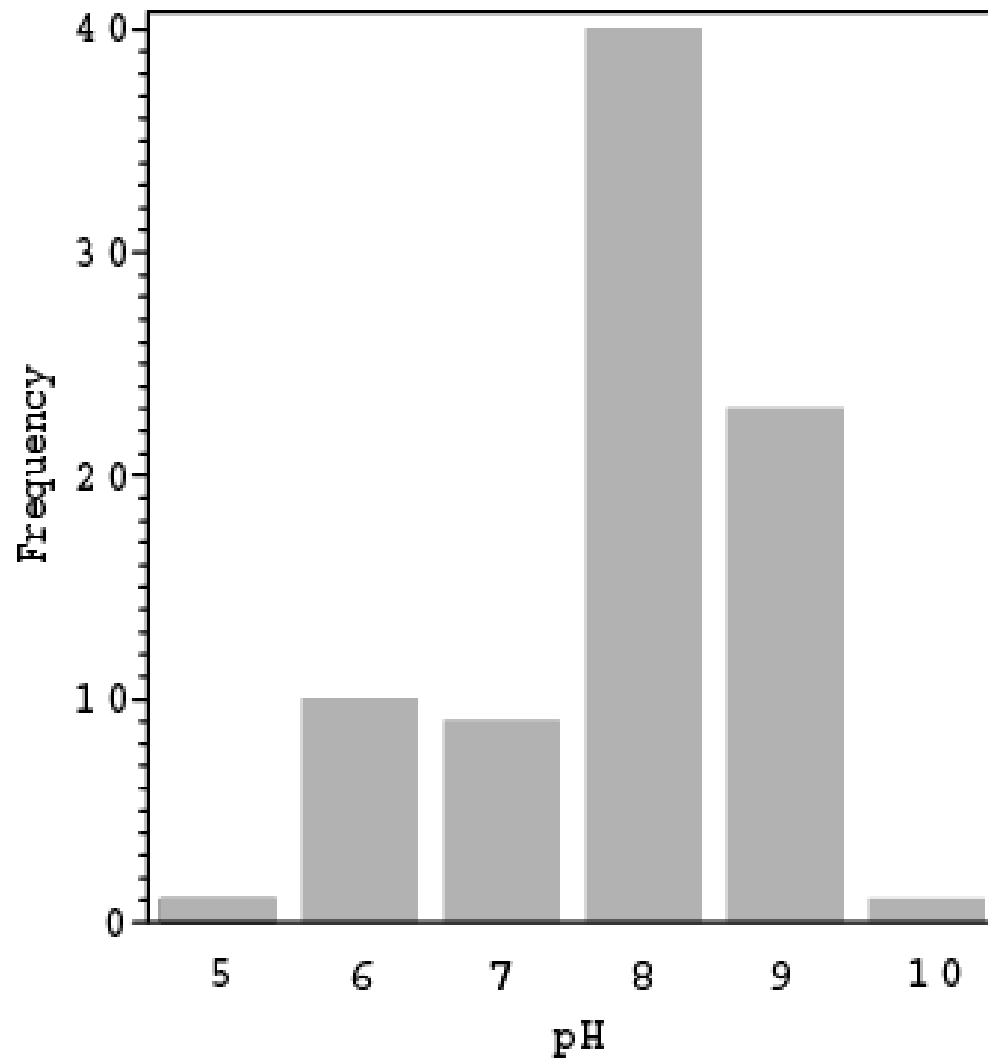
(California only, n = 174)



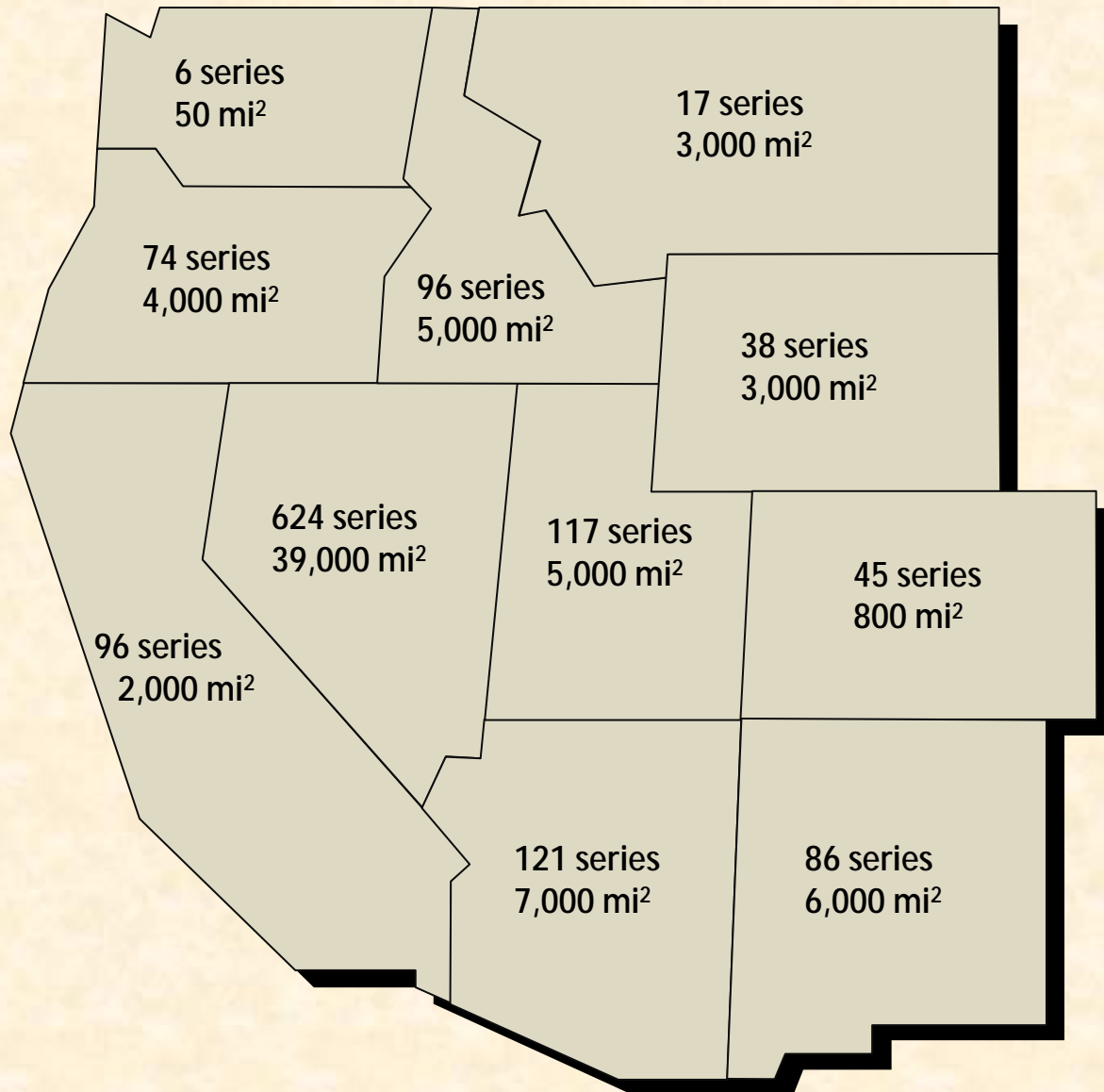
Organic Carbon



pH



Vesicular Horizon Occurrence in western USA



Ecological Significance of Desert Pavements & Vesicular Horizons

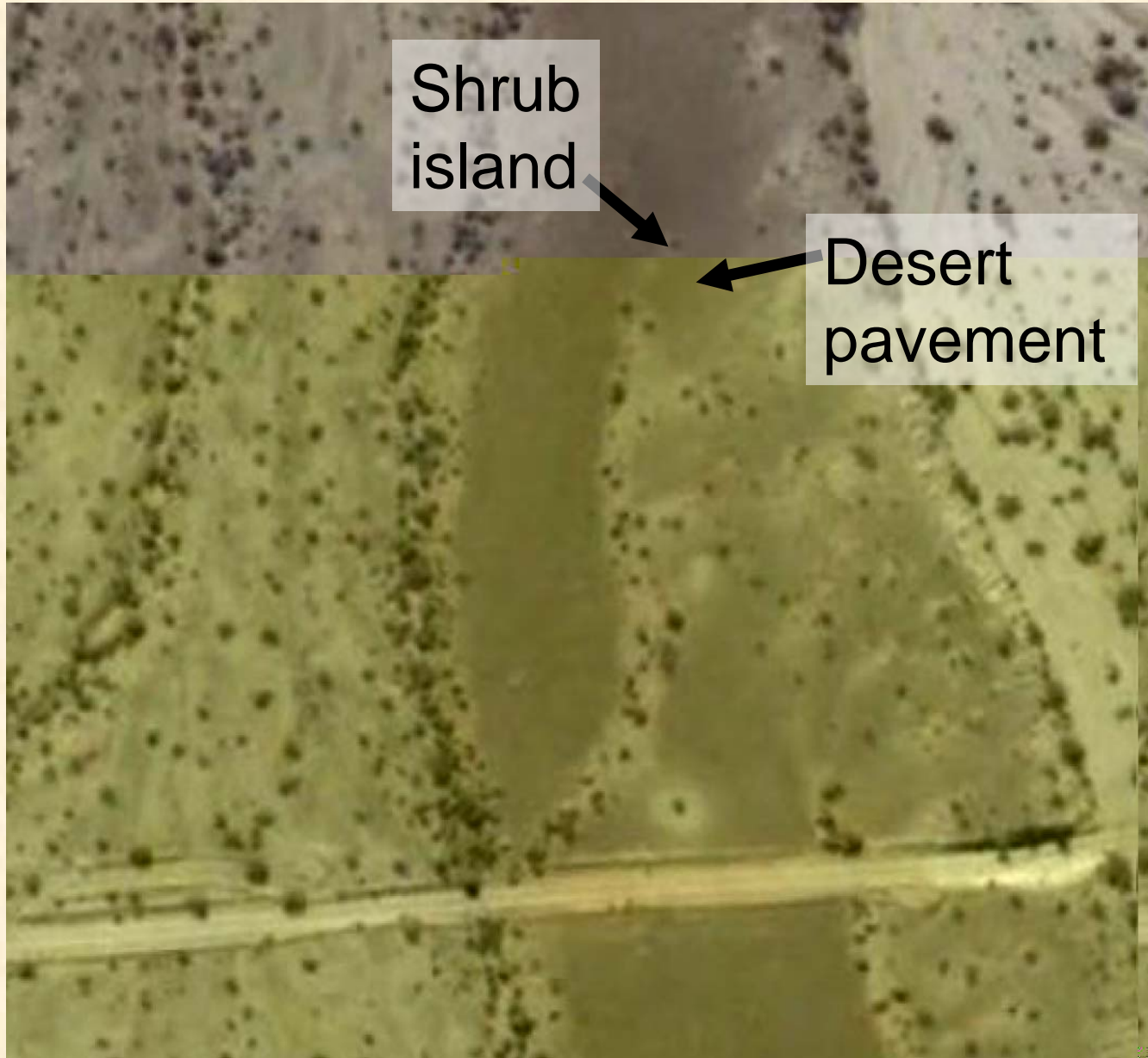
- Restrict infiltration rate.
- Redistribute water: runoff, runoff
- Increase salinization.
- Accumulate nitrate.
- Source of dust if disrupted.

4 ka

10 ka

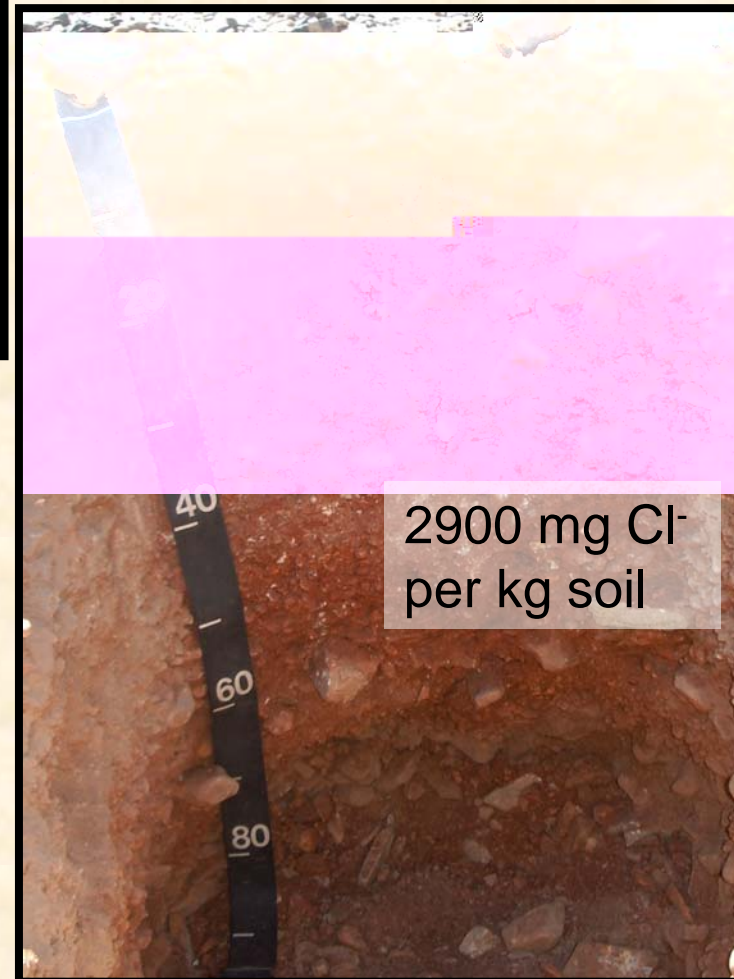
50-100 ka

Aerial view of alluvial fan surfaces, Pinto Basin



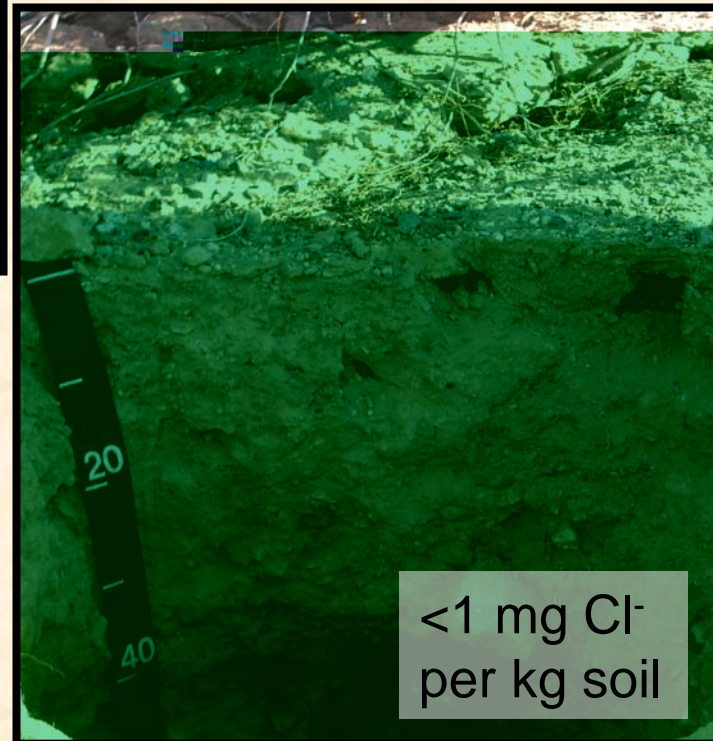
Desert Pavement on old alluvial fan

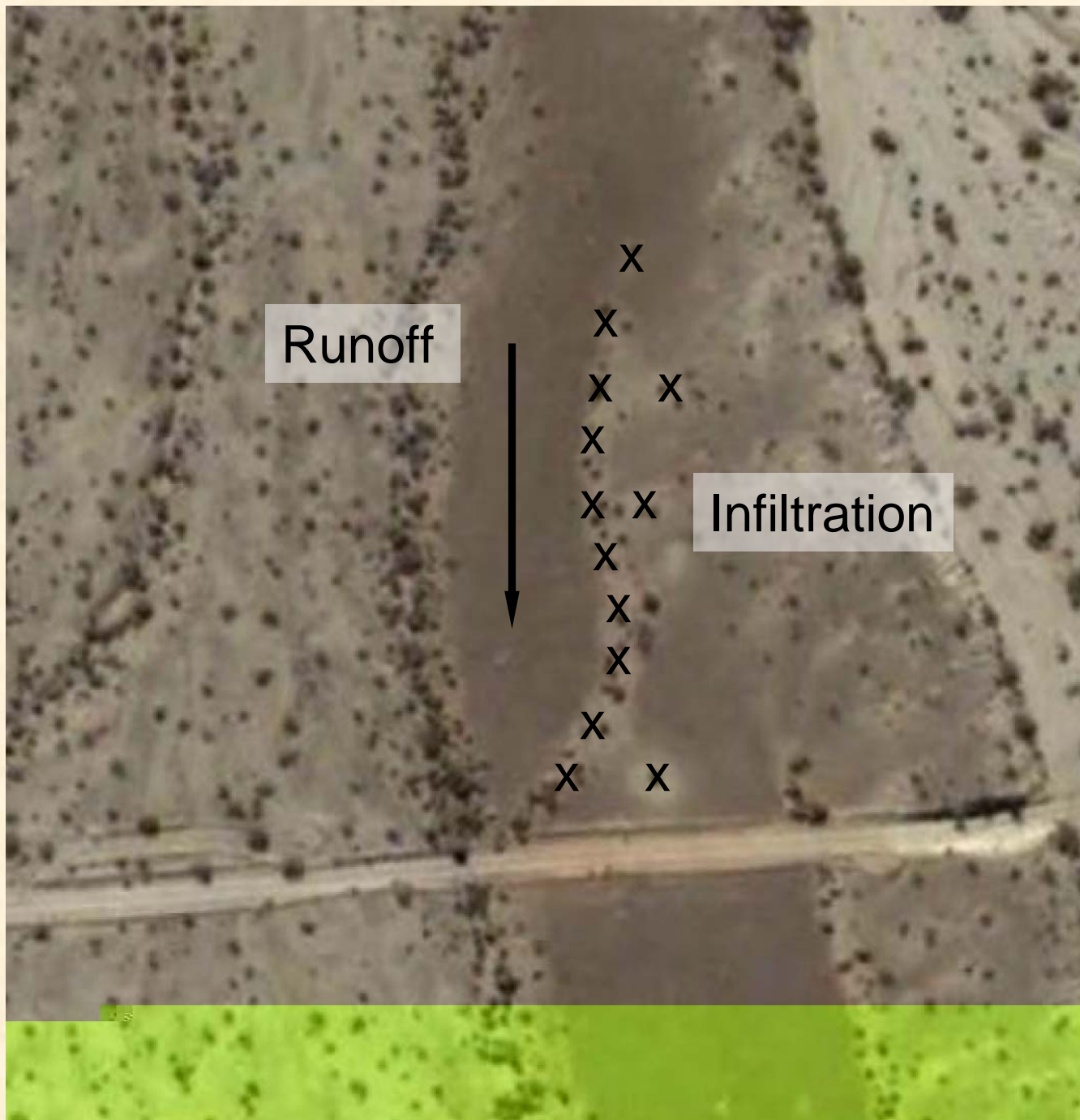
Runoff >>> Infiltration



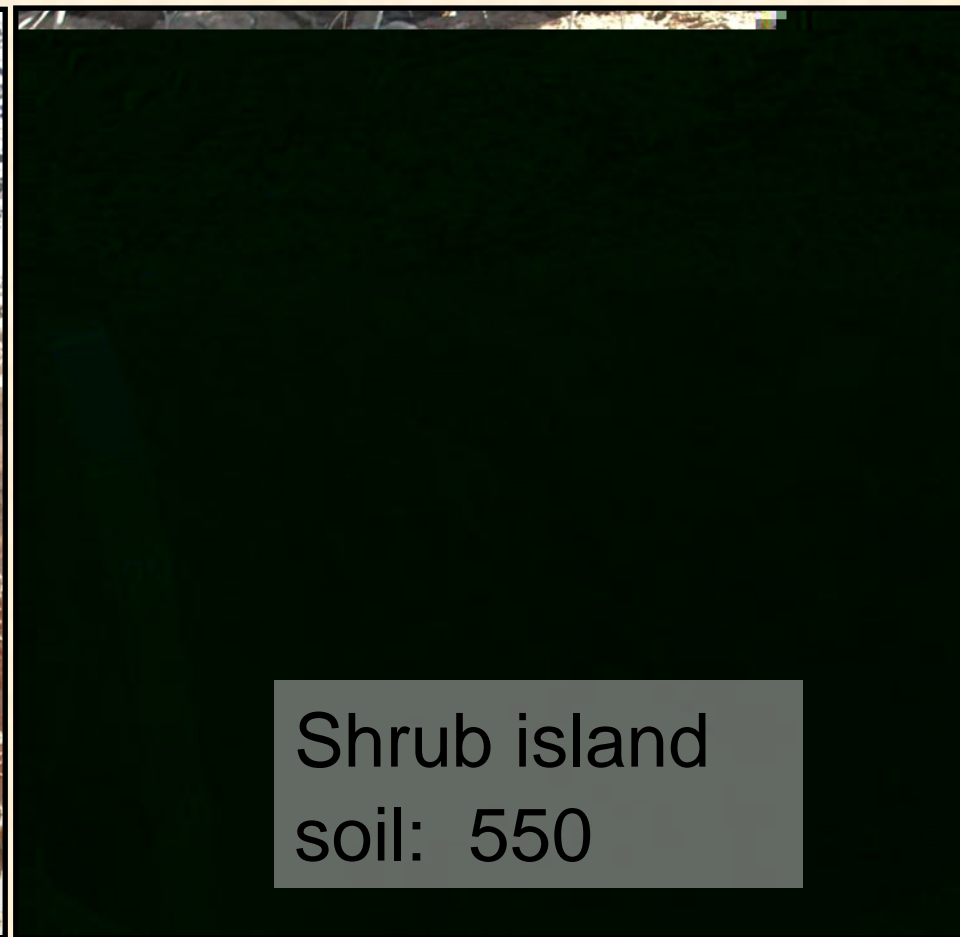
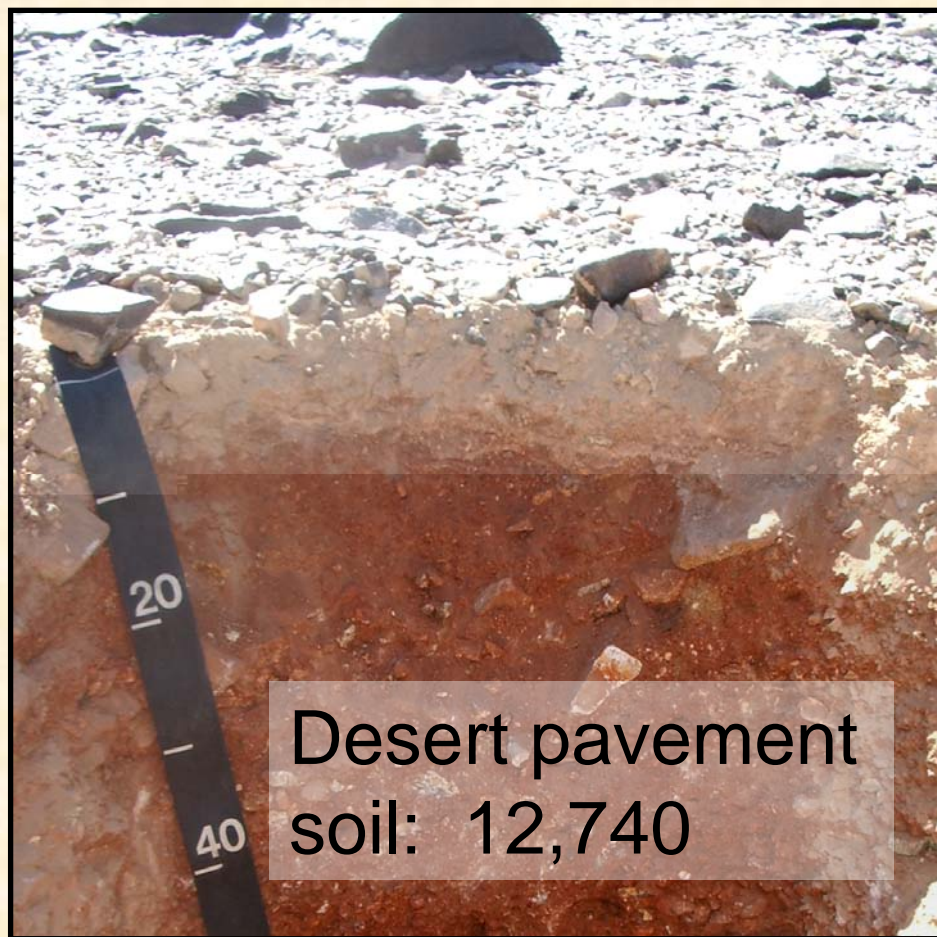
Shrub Island

Infiltration >>> Runoff





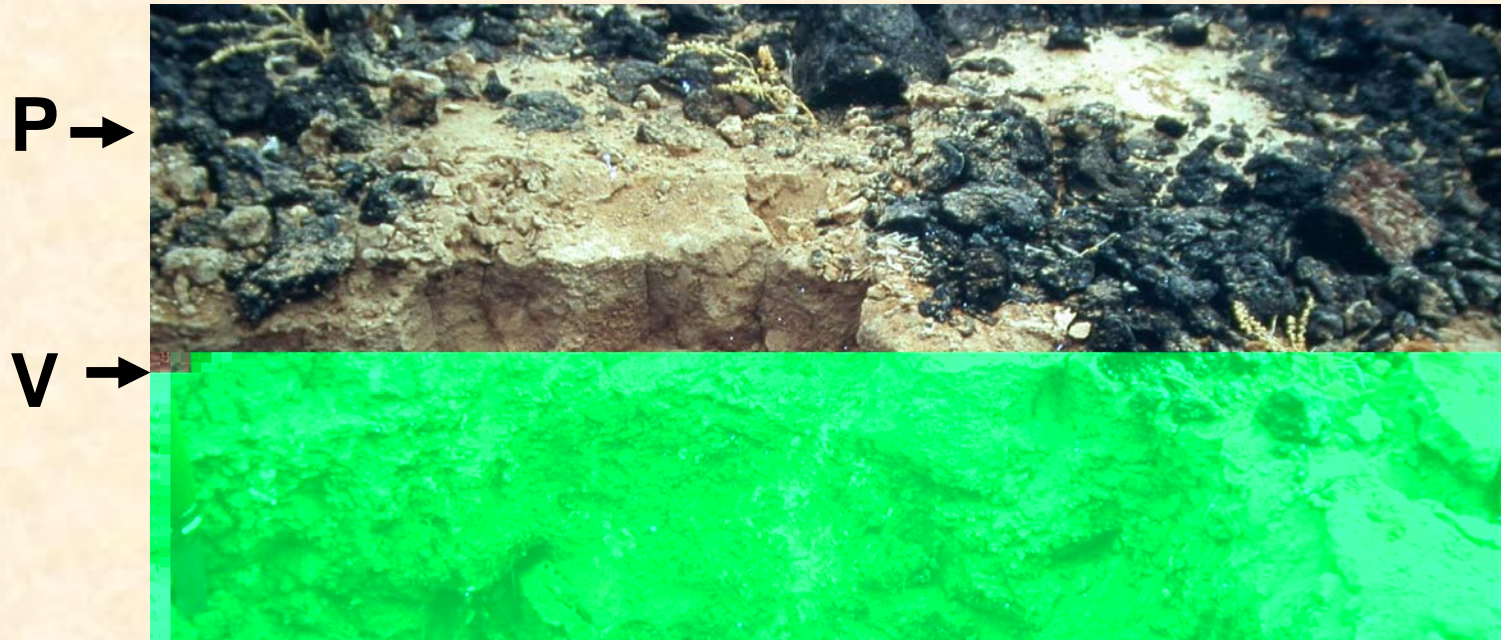
Nitrate-N content (kg ha^{-1})



Perspective

- Total N in midwest Mollisol: $\sim 9,000 \text{ kg ha}^{-1}$

Desert Pavements & Vesicular Horizons:



- Control important soil processes.
- Need to inventory & study these features.
- Horizon designations are needed.

Acknowledgements

- Judy Turk, UCR Graduate Student
- Dave Smith, NRCS-CA
- Pete Bigham, NPS
- Bill Ypsilantis, BLM
- Paul DePrey, Joshua Tree NP
- Steve Borchard, BLM-CA
- Bob Ahrens, NRCS-NSSL
- UC Kearney Foundation of Soil Science